

EOS Mission Support Network Performance Report

This is a monthly summary of EMSnet performance testing -- comparing the performance against the requirements.

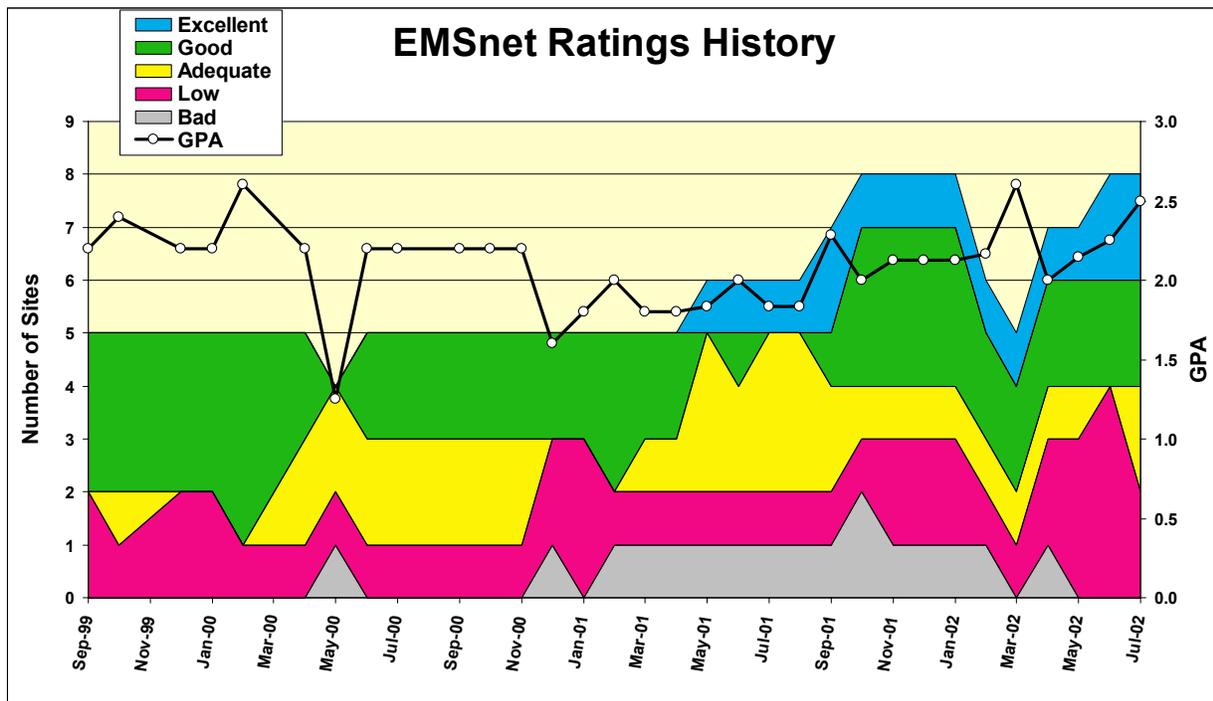
All results are reported on the web site: (Note correction)
http://corn.eos.nasa.gov/performance/Net_Health/EMSnet_list.html. It shows MRTG-like graphs of the performance to various test sites.

Highlights:

- LDAAC testing restored through firewall in July (had stopped 13 June for firewall installation). Results about the same as previously, slight degradation noted.
- All testing to or from NASDA stopped 31 July to move the NASDA test machine to the new circuit to JPL. Testing from NASDA to GSFC improved very slightly, but went from below to above the requirement, so rating improved. Measurement is limited by NASDA host; network could support more.
- Testing to LDAAC from GSFC improved with NISN reconfiguration in June: thruput was typ 50 mbps, now 84. Adding MRTG gets slightly below requirement, so rating is still "LOW".
- Testing from GSFC to EDC: Added a test host at EDC in July (similar to one at GSFC in June). Testing between these two hosts uses the same WAN, but avoids the DAAC firewalls. This test improves rating to "Adequate". Degradation due to firewalls would reduce rating.
- Testing from GDAAC to PODAAC still inop -- route is via NISN SIP due to LAN upgrade at GSFC. However, testing from GSFC-MODIS to PODAAC, and GSFC-CSAFS to JPL- SEAPAC via EMSnet.
- Testing from ASF to JPL-SEAPAC and NASDA to ASF stopped 17 June, due to firewall at ASF -- restored 9 July. Thruput as expected.
- All other continuing tests had stable performance.

Ratings:

The chart below shows the number of sites in each classification since EMSnet testing started in September 1999. Note that these ratings do NOT relate to absolute performance -- they are relative to the EOS requirements. The GPA is calculated based on Excellent: 4, Good: 3, Adequate: 2, Low: 1, Bad: 0



Rating Categories:

- Excellent** : Total Kbps > Requirement * 3
- Good** : 1.3 * Requirement <= Total Kbps < Requirement * 3
- Adequate** : Requirement < Total Kbps < Requirement * 1.3
- Low** : Total Kbps < Requirement.
- Bad** : Total Kbps < Requirement / 3

Where Total Kbps = MRTG + iperf monthly average

Ratings Changes:

Upgrades: ↑:

GSFC → EDC: Low → Adequate
 NASDA → US: Low → Adequate

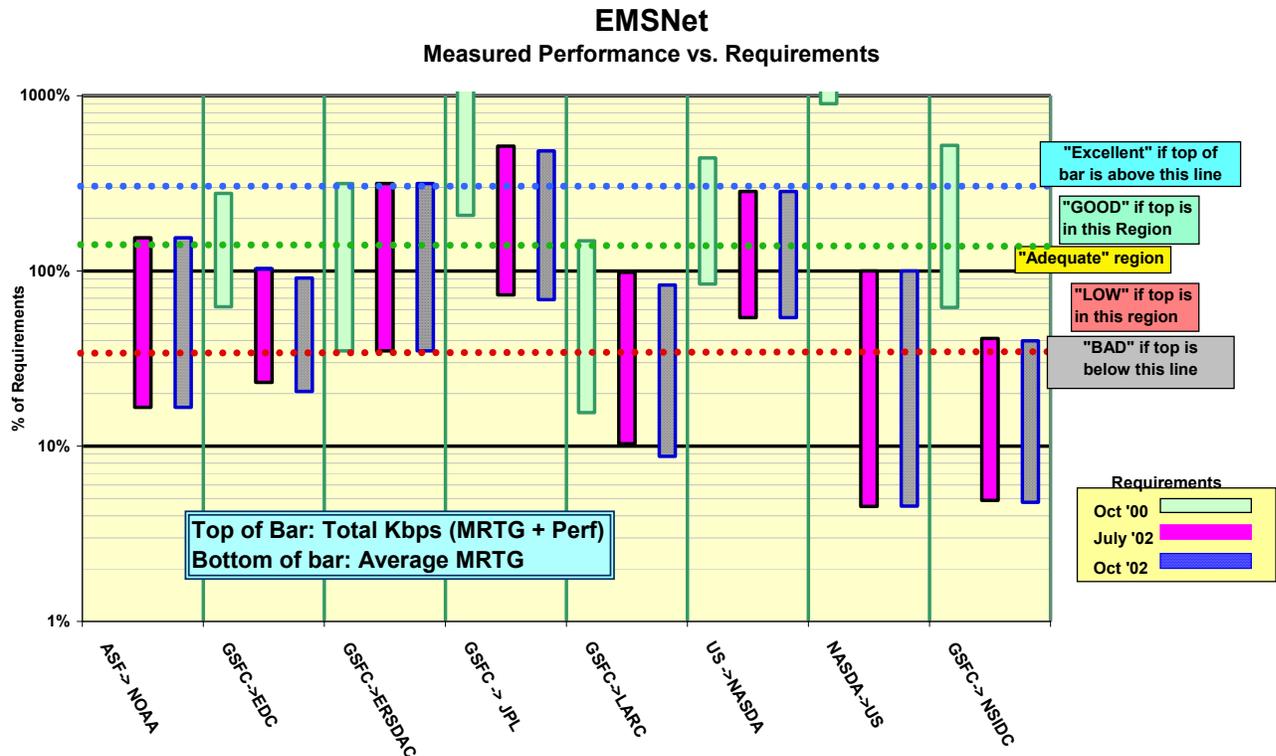
Downgrades: ↓: None

EMSnet Sites: Network Requirements vs. Measured Performance

July 2002		Requirements (kbps)			Testing						
Source -> Destination	Team (s)	Previous (Oct '00)	Current (July '02)	Future (Oct '02)	Source Node : Test Period	MRTG Avg kbps	Perf Avg kbps	Total Avg kbps	Current Status re July '02*	Prev Stat	Current Status re Oct '02*
ASF-> NOAA	ADEOS II	0	1864	1864	ASF->NESDIS: 01-Apr-02 - 23-Jul-02	310	2574	2884	GOOD	G	GOOD
GSFC->EDC	MODIS, LandSat	82380	221938	250335	DOORS-EDCTest: 06-Jul-02 - 18-Jul-02	51400	176530	227930	Adequate	L	LOW
GSFC->ERSDAC	ASTER	275	275	275	GDAAC: 04-Jun-02 - 31-Jul-02	96	770	866	Excellent	E	Excellent
GSFC -> JPL	QuikScat, TES, MLS, et	299	851	906	CSAFS: 01-Apr-02 - 31-Jul-02	621	3762	4383	Excellent	E	Excellent
GSFC->LARC	CERES, MISR, MOPITT	63036	95277	112800	GDAAC: 04-Jul-02 - 31-Jul-02	9823	83874	93697	LOW	L	LOW
US ->NASDA	QuikScat, TRMM, AMSR	555	863	863	CSAFS: 03-May-02 - 31-Jul-02	467	1986	2453	GOOD	G	GOOD
NASDA->US	AMSR	0.2	1574	1574	NASDA-EOC: 01-Sep-01 - 27-Jul-02	71	1503	1574	Adequate	L	Adequate
GSFC-> NSIDC	MODIS	8281	104971	108166	GDAAC: 03-May-02 - 31-Jul-02	5125	38037	43162	LOW	L	LOW
Notes: All flow requirements listed are the greater of inflow or outflow						Ratings Summary					
Flow Requirements (from BAH) include TRMM, Terra , Aqua, QuikScat, ADEOS II											
						Score		Prev		Score	
*Criteria:	Excellent	Total Kbps > Requirement * 3				Excellent		2	2	2	
	GOOD	1.3 * Requirement <= Total Kbps < Requirement * 3				GOOD		2	2	2	
	Adequate	Requirement < Total Kbps < Requirement * 1.3				Adequate		2	0	1	
	LOW	Total Kbps < Requirement				LOW		2	4	3	
	BAD	Total Kbps < Requirement / 3				BAD		0	0	0	
Change History:		27-Sep-99	Original - TRMM, Terra, and QuikScat			Total		8	8	8	
		19-Jan-01	Incorporated BAH requirements including additional missions								
		9-Apr-01	Updated BAH requirements								
		4-Jun-01	Added 50% contingency to BAH requirements								
		16-Nov-01	Added MRTG to lperf, updated requirements, Revised criteria					GPA		2.50	2.25

Comparison of measured performance with Requirements:

This graph shows three bars for each destination. Each bar uses the same actual measured performance, but compares it to the requirements for three different times (Oct '00, July '02, and Oct '02). Thus as the requirements increase, the same measured performance will be a bit lower in comparison.



Note that the interpretation of these bars has changed from Sept '01. The bottom of each bar is the average measured MRTG flow to that site (previously daily minimum). Thus the bottom of each bar can be used to assess the relationship between the requirements and actual flows. Note that the requirements include a 50% contingency factor above what was specified by the projects, so a value of 66% would indicate that the project is flowing as much data as requested.

Details on individual sites:

1) ASF → CONUS:

Rating: Continued **Good**

Test Results:

Source → Dest	Medians of daily tests (kbps)			MRTG	TOTAL
	Best	Median	Worst		
ASF → NESDIS	2701	2574	769	310	2884
ASF → GSFC-CSAFS	2714	2477	842		

Requirements:

Source → Dest	FY	kbps	Rating
ASF → NESDIS	'02, '03	1864	Good

Comments: The 2.9 mbps total thrupt is about as expected for a 2 * T1 (3.1 mbps) circuit with competing flows. Since this is more than 30% over the July '02 requirement, the rating is "Good"

2) GSFC → EDC:

Rating: **↑ Low → Adequate**

Test Results:

Source → Dest	Test Period	Medians of daily tests (mbps)			MRTG	TOTAL
		Best	Median	Worst		
Doors → EDC-Test	06-Jul-02 – 18 Jul-02	218.3	176.5	105.3	51.4	227.9
Doors → EDC DAAC	15-Jun-02 – 31-Jul-02	192.4	150.6	82.6		
G-DAAC → EDC DAAC	29-May-02 – 31-Jul-02	159.9	94.3	44.4		

Requirements:

Date	mbps	Rating
July '02	222	Adequate
Oct '02	250	Low

On July 6, a test node was installed at EDC, to eliminate the effects of the EDC DAAC ECS firewall, similar to the "Doors" node installed at GSFC in June. The three test cases above show the use of the same WAN, but with 0, 1 or 2 firewalls in the path. The differences can be used to assess the effects of the firewalls on performance.

Since performance between the two test nodes is superior to that using either DAAC, and it is more representative of the network performance, this case will be used to determine the ratings. Multiple streams are used for thrupt testing in all cases, to eliminate window size limitations.

So now, the combined MRTG + thrupt testing is slightly above the July '02 requirement. This raises the rating to "Adequate"!

3) GSFC → ERSDAC: Rating: Continued **Excellent**

GSFC → ERSDAC Test Results:

Test Period	Medians of daily tests (kbps)			MRTG	TOTAL
	Best	Median	Worst		
4-Jun-02 - 31-Julyn-02	796	770	490	96	866

Performance using 1 mbps ATM connection is very stable.

Requirements:

Source → Dest	FY	kbps	Rating
GSFC → ERSDAC	'02, '03	275	Excellent

4) JPL: Rating: Continued **Excellent**

Test Results:

Source → Dest	Medians of daily tests (kbps)			MRTG	TOTAL
	Best	Median	Worst		
GSFC-CSAFS → JPL-SEAPAC	4062	3762	2232	621	4383
LaRC DAAC → JPL-TES	3338	2737	2001		
GSFC DAAC → JPL-TES	21687	12282	3909		
GSFC-MTVS1 → JPL-PODAAC	3896	3335	1540		
NASDA-EOC → JPL-SEAPAC	2432	2412	1456		
ASF → JPL-SEAPAC	2793	2623	1280		

Requirements:

Source → Dest	Date	mbps	Rating
GSFC-CSAFS → JPL-SEAPAC	June '02	550	Excellent
	Oct '02	906	Excellent
LaRC DAAC → JPL-TES	Oct '02	2050	Good

The rating is based on testing from CSAFS at GSFC to SEAPAC at JPL. Note that the MRTG flows to JPL includes flows from all GSFC and LaRC sources, and also includes flows destined to NASDA and ASF. The measured performance rates as "Excellent" compared with the Feb. '02 ICESAT requirement of 550 kbps. Other GSFC and LaRC sources have similar performance, all limited by the NISN GSFC→JPL VC configuration.

Testing from LDAAC restarted 12 July (had stopped 18 June when the LARC ECS firewall was installed, blocking all testing from the LaRC DAAC). Performance is slightly lower through the firewall (median was 3346, now 2737 kbps)

On May 8, the route from GDAAC to JPL-TES switched to NISN SIP. Performance improved substantially as a result. However, this is only a temporary route for this flow -- the intended route is via Emsnet, which should be installed after the GSFC LAN upgrade is complete. Testing from GSFC-DAAC to JPL-PODAAC is also currently routed via NISN SIP, so EMSnet testing is performed from MTVS1. Performance is stable near the VC limit.

NASDA → JPL-SEAPAC testing is very stable at 2.4 mbps typical thruput. This testing has been stopped at the end of July to test the replacement circuit scheduled for installation in August.

ASF → JPL-SEAPAC testing resumed July 9, after firewall blocking at ASF was corrected. Thruput was steady at about 2.6 mbps, using the 2 T1s.

5) GSFC → LaRC:

Rating: Continued **Low**

Test Results:

Test Period	Medians of daily tests (mbps)			MRTG	TOTAL
	Best	Median	Worst		
04-July-02 – 31-July-02	98.6	83.9	43.7	9.8	93.7

Requirements:

Date	mbps	Rating
May '02	95	Low
Oct '02	113	Low

Testing to LaRC resumed on 3 July, when the LaRC ECS firewall was configured to allow testing. It had been stopped June 13, for installation of the firewall.

The NISN circuit had been upgraded in mid June. Performance in this new configuration is much improved from the old one, which had a median of only about 50 mbps. But there is now a limit a bit above 100 mbps, even using multiple TCP streams. This makes it hard to achieve the 95 mbps requirement – but the performance is very close. So the rating continues “Low”.

6A) US (GSFC) → NASDA:

Rating: Continued **Good**

Test Results:

Source → Dest	Medians of daily tests (kbps)			MRTG	TOTAL
	Best	Median	Worst		
GSFC-CSAFS → NASDA-EOC	2237	1986	693	467	2453

Requirements:

Source → Dest	FY	kbps	Rating
GSFC → NASDA	'02, '03	863	Good

Testing since Jan 19 from GSFC-CSAFS, using multiple TCP streams since May 3, to overcome the window size limitation of the NASDA test host. Performance stable at 2.3 mbps peaks, about as expected for a 3 mbps ATM PVC.

6B) NASDA → US (GSFC):

Rating: ↑ Low → **Adequate**

=Test Results:

Source → Dest	Medians of daily tests (kbps)			MRTG	TOTAL
	Best	Median	Worst		
NASDA-EOC → GSFC-CSAFS	1647	1503	757	71	1574

Requirements:

Source → Dest	FY	kbps	Rating
NASDA → GSFC	'02, '03	1574	Adequate

Performance is stable, but improved slightly, and is now exactly at the requirement. Again, performance appears limited by the NASDA machine window size (working with NASDA to remove this testing limitation.) Testing stopped on 27 July to move the NASDA machine to test the replacement circuit.

7) NSIDC:

Rating: Continued **Low**

GSFC → NSIDC Test Results:

Test Period	Medians of daily tests (mbps)			MRTG	TOTAL
	Best	Median	Worst		
3-May-02 – 30-June-02	49.0	38.0	28.0	5.1	43.1

Requirements:

Date	mbps	Rating
July '02	105	Low
Oct '02	108	Low

NISN reports a VC SCR of 110 mbps. However, thruput appears limited at a bit over 50 mbps. Using multiple parallel TCP streams does not appear to improve the overall thruput (its only effect appears to be raising the daily worst value – by grabbing a bigger share of the limited link). This is considered a problem, and will be investigated.

Other Testing:

Source → Dest	Medians of daily tests (kbps)			Requirement	Rating
	Best	Median	Worst		
JPL → NSIDC-SIDADS	2588	2353	2125	260	Excellent
LDAAC - NSIDC					

Performance from JPL to NSIDC is very stable, and appears limited by a NISN VCs. Testing from LDAAC to NSIDC was stopped in June for installation of the LDAAC firewall, and has not been restarted. Will try to restart in August.